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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,229	09/30/2003	Yasuhiro Sekiguchi	501558.20002	6378

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EXAMINER	
DICHT, RACHEL S	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/676,229	SEKIGUCHI, YASUHIRO	
	Examiner	Art Unit	
	Rachel Dicht	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-12,14,15,17 and 18* is/are rejected.

7)☒ Claim(s) *7,13 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/30/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

- Ink jet printing head 10 not listed in figures (Paragraph [0038]);
- Nozzles 24-3 and 24-4 not listed in Figures 2 through 6 (Paragraph [0040])
- Nozzle 24 not listed in Figures 8A and 8B (Paragraph [0058])
- Manifold chambers 26a-26h not listed in figures (Paragraph [0062]).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 17, 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeuchi et al. (European Patent No. 0 600 743 A2).

In regard to:

Claim 1:

Takeuchi et al. teaches an ink jet printing head comprising a cavity unit and an actuator (54, Fig. 1) which are superposed on each other, wherein said

cavity unit is a laminar structure including a plurality of plates superposed on each other in a vertical direction of said cavity unit (refer to column 7 lines 15-33), and has (a) a plurality of nozzles (64, Fig. 1) which are open in a surface thereof that is to be opposed to a print media and which are arranged in at least one row (64, Fig. 3), (b) a plurality of pressure chambers (56, Fig. 1) which are arranged in a direction of said at least one row of said nozzles, (c) a plurality of communication passages (86, 66, and 67, Fig. 1) for communication between the respective pressure chambers and the respective nozzles, and (d) a manifold portion (52, Fig. 1) which stores an ink supplied from an ink supply source (72, Fig. 1) and re-fills the pressure chambers (refer to column 6 lines 57-58 to column 7 line 1), wherein said actuator has a plurality of active portions which correspond to said pressure chambers (refer to column 7 lines 24-33), respectively, and which are selectively operable to eject the ink from the corresponding nozzles, wherein said pressure chambers are arranged with a first spacing pitch between each adjacent pair of said pressure chambers (the distance between pressure chambers 56 in Fig. 2), except at least one adjacent pair of said pressure chambers which are spaced apart from each other by a second spacing pitch that is larger than said first spacing pitch (distance between the first column of pressure chambers 56 and the second column of pressure chambers 56, Fig. 9), and wherein each of said communication passages includes at least one horizontally extending portion (72, Fig. 1) which extends in parallel with a horizontal direction of said cavity unit.

Claim 2:

Takeuchi et al. teaches an ink jet printing head wherein said actuator includes of a plurality of mutually independent actuator units (90, Fig. 3) which are disposed such that end faces of each of at least one adjacent pair of said actuator units (90, Fig. 3) are opposed to each other in said direction of said at least one row of said nozzles (64, Fig. 3), each of said actuator units having a length covering a predetermined number of said pressure chambers (28, Fig. 6) which are arranged in said direction of said at least one row of said nozzles (2, Fig. 6), and wherein said end faces of each of said at least one adjacent pair of said actuator units are located between a corresponding one of said at least one adjacent pair of said pressure chambers which are spaced apart from each other by said second spacing pitch (distance between the first column of pressure chambers 56 and the second column of pressure chambers 56, Fig. 9).

Claim 3:

Takeuchi et al. teaches an ink jet printing head wherein each of said communication passages consists of said at least one horizontally extending portion (72, Fig. 1) and at least on vertically extending portion (66 and 67, Fig. 1) which extends in parallel with said vertical direction of said cavity unit (84 and 52, Fig. 1).

Claim 4:

Takeuchi et al. teaches an ink jet printing head wherein each of said at least one horizontally extending portion (72, Fig. 1) is provided by a horizontally extending recess (80, Fig. 1) which is formed in a recess-defining plate (78, Fig. 1) that is one of said plates and which extends in a direction parallel to said recess-defining plate.

Claim 5:

Takeuchi et al. teaches an ink jet printing head wherein each of said pressure chambers (56, Fig. 2) is elongated in a direction perpendicular to said direction of said at least one row of said nozzles (64, Fig. 2) and is held in communication at a longitudinal end portion (edges of pressure chamber 56, Fig. 2)) thereof with corresponding one of said communication passages, and wherein said horizontally extending recess (80, Fig. 1) has opposite end portions, one of which is aligned with said longitudinal end portion of a corresponding one of said pressure chambers (56, Fig. 1; end closest to numeral 87) in said vertical direction of said cavity unit, and the other of which is aligned with a corresponding one of said nozzles (64, Fig. 1; end closest to numeral 86) in said vertical direction.

Claim 6:

Takeuchi et al. teaches an ink jet printing head wherein said pressure chambers include first and second pressure chambers which are alternately arranged in said direction of said at least one row of said nozzles (first pressure chambers 56 located to left, second pressure chambers 56, located to right of Fig. 9), wherein said communication passages include first and second communication passages which are alternately arranged in said direction of said at least one row of said nozzles (86 and 87 on first and second pressure chambers located in Fig. 9), and which communicated with said first and second pressure chambers, respectively, and wherein said recess providing each of said at least one horizontally extending portion (80, Fig. 9) of each of said first communication passages is formed in one of opposite surfaces of said recess-defining plate (78, Fig. 1), while said recess providing each of said at least one horizontally extending portion of each of said second communication passage is formed in the other of said opposite surfaces of said recess-defining plate (refer to column 14 lines 51-58 to column 15 lines 1-3).

Claim 8:

Takeuchi et al. teaches an ink jet printing head wherein said horizontally extending recess (80, Fig. 1) is formed in one of opposite surfaces of said recess-defining plate (78, Fig. 1) that is closer to said pressure chamber (56, Fig. 1).

Claim 9:

Takeuchi et al. teaches an ink jet printing head wherein said plurality of mutually independent actuator units include two actuator units as said each of said at least one adjacent pair of said actuator units (located on top of pressure chambers 56, Fig. 10; piezoelectric element [actuator] not shown), wherein said plurality of pressure chambers include two groups of pressure chambers (56, Fig. 10) which correspond to said two actuator units, respectively, wherein said communication passages include two groups of communication passages which are hld in communication with said two groups of pressure chambers, respectively, and wherein the communication passages of one of said two groups and the communication passages of the other of said two groups are formed symmetrically with each other with respect to a plane which is parallel to said vertical direction and which is perpendicular to said direction of said at least one row of said nozzles.

Claim 10:

Takeuchi et al. teaches an ink jet printing head wherein said pressure chambers (56, Fig. 1) are formed in a pressure chamber defining plate (82, Fig. 1) which is one of said plates and which is contiguous to said recess-defining plate(78, Fig. 1).

Claim 11:

Takeuchi et al. teaches a printing head wherein said pressure chambers (56, Fig. 1) are formed in a pressure chamber defining plate (82, Fig. 1) which is one of said plates, and wherein said recess defining plate (78, Fig. 1) is interposed between said pressure chamber defining plate and at least one of said plates in which said manifold portion is formed (60, Fig. 1; orifice plate 60 is part of ink nozzle member 52).

Claim 12:

Takeuchi et al. teaches an ink jet printing head wherein said nozzles (64, Fig. 3) arranged in each of said at least one row are spaced apart from each other by said first spacing pitch. (refer to column 15 lines 3-7).

Claim 14:

Takeuchi et al. teaches an ink jet printing head wherein each of said at least one horizontally extending portion (72, Fig. 1) extends in a direction inclined with respect to said direction of at least one row of nozzles (64, Fig. 1).

Claim 15:

Takeuchi et al. teaches an ink jet printing head wherein one of said opposite end portions of said horizontally extending recess (80, Fig. 8a) is larger in area than the other (end closest to label 86 noticeably larger than end closest to label as 87).

Claim 18:

Takeuchi et al. teaches an ink jet printing head wherein said pressure chambers are arranged in two rows in a zigzag pattern (56, Fig. 9) (refer to column 14 lines 49-51), wherein said nozzles (located in slit 80 but not shown in Fig. 9) are arranged in two rows in a zigzag pattern which are located between said two rows of said pressure chambers, and wherein said communication passages are arranged in two rows in a zigzag pattern each of which is located between a corresponding one of said two rows of said nozzles and a corresponding one of said two rows of said pressure chambers.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (European Patent No. 0 600 743 A2) in view of Takagi (Pub. No. 2002/0024567).

The device of Takeuchi et al. DIFFERS from claim 17 in that it fails to teach an ink jet printing head wherein said actuator includes a first piezoelectric

sheet formed with individual electrodes and a second piezoelectric sheet formed with a common electrode, said first and second piezoelectric sheets being superposed on each other, and wherein said active portions are defined between said individual electrodes and said common electrodes.

However, Takagi teaches an ink jet printing head wherein said actuator (20, Fig. 5) includes a first piezoelectric sheet (22, Fig. 5) formed with individual electrodes (30, Fig. 5) and a second piezoelectric sheet (21a, 21b, 21c, 21d, 21e, 21f, and 21g, Fig. 5) formed with a common electrode (27, Fig. 5), said first and second piezoelectric sheets being superposed on each other, and wherein said active portions are defined between said individual electrodes and said common electrodes (refer to column 4 paragraphs [0058]-[0061]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Takeuchi et al. to include a first and second piezoelectric sheet formed with individual electrodes and common electrodes as taught by Takagi for the purpose of vertically aligning and electrically connecting the electrodes.

Allowable Subject Matter

6. Claims 7, 13, and 16 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the allowance of claims 7, 13, and 16 is the inclusion of the limitations of:

Claim 7:

An ink-jet printing head wherein said recess providing each of said at least one horizontally extending portion of each of said first communication passages has a first depth value, while said recess providing each of said at least one horizontally extending portion of each of said second communication passages has a second depth value, and wherein a sum of said first depth value and said second depth value is smaller than a thickness value of said recess-defining plate.

Claim 13:

An ink-jet printing head wherein said nozzles are arranged in four rows, and wherein said active portions of said actuators are arranged in four rows each of which is parallel to a corresponding one of said four rows of said nozzles.

Claim 16:

An ink-jet printing head wherein said first and second communication passages which are adjacent to each other overlap partially in a plan view of said cavity unit.

It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rachel Dicht whose telephone number is 571-272-8544. The examiner can normally be reached on 7:00 am - 3:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RSD

July 26, 2005

8/5/05

MANISH S. SHAH
PRIMARY EXAMINER